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National Survey on Drug Use and Health

The CBHSQ Report

Short Report

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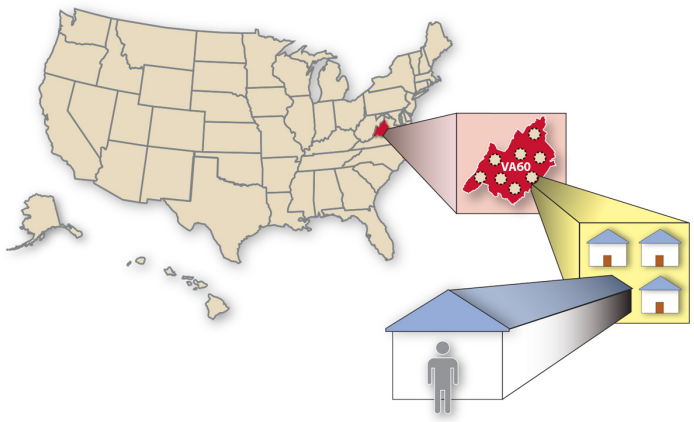
UNDERAGE BINGE DRINKING VARIES WITHIN AND ACROSS STATES



AUTHORS

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In Brief

- Combined 2012–2014 National Survey on Drug Use and Health state- and substate data can advance the understanding of underage binge drinking in U.S. communities.
- Nationally, 14.44 percent of people aged 12 to 20 binge drank in the past month.
- Among states, estimates of underage binge drinking ranged from 10.98 percent in Utah to 21.42 percent in North Dakota.
- Among the substate regions, estimates of underage binge drinking ranged from 8.37 percent in Shelby County (Tennessee) to 42.39 percent in Ward 2 (District of Columbia).
- Of the 16 substate regions with the lowest estimates of underage binge drinking, 12 were in the South and 4 were in the West.
- Of the 16 substate regions with the highest rates of underage binge drinking, 9 were in the Northeast, 4 were in the South, 4 were in the Midwest, and 1 was in the West.
- Compared with the estimate from 2010–2012, the estimate of past month underage binge drinking in 2012–2014 was lower in the nation as a whole (15.87 percent in 2010–2012 vs. 14.44 percent in 2012–2014).
- Between 2010–2012 and 2012–2014, 18 states plus the District of Columbia experienced a statistically significant decrease in estimates of past month underage binge drinking, while the remaining 32 states experienced no change.

INTRODUCTION

Alcohol use constitutes a serious public health issue for young people in the United States because binge drinking can have negative health, social, and economic consequences for these youths, their families, and communities.[1,2] For example, youths who engage in frequent binge drinking in high school are more likely to engage in other risky behaviors, such as using marijuana and cocaine, having sex with six or more partners, and earning grades that are mostly Ds and Fs in school.[3] In addition, the U.S. Department of Health and Human Services Healthy People 2020 initiative identified reducing rates of binge drinking among adolescents and college students as a national priority.[4]

Research suggest that between 2008 and 2014, underage binge drinking by people aged 12 to 20 declined in the United States from 19.3 percent in 2002 to 13.8 percent in 2014.[5] This represents more than a 20 percent decline in underage drinking from a 2008 baseline to 2014. Although the national trend in underage drinking is encouraging, underage drinking remains a concern in the United States, especially because its consequences are experienced in states and local communities every year. Excessive drinking still results in more than 4,300 deaths per year among underage youths. In 2010, underage youths made almost 190,000 emergency department visits for alcohol-related injuries, and the economic cost of underage drinking was $24 billion.[6] As a result, continued efforts are being made to identify where underage drinking is more common and where it is less prevalent. Within each state, patterns of drinking vary in different regions. For example, the availability of alcohol, drinking norms, demographic makeup of an area, and the economics of an area contribute to regional variations in drinking behaviors.[6,7] Preventing underage alcohol consumption is particularly important to the individual states within the United States, which have had authority for alcohol control since 1933. All 50 states and the District of Columbia prohibit possession of alcoholic beverages by people younger than age 21, and most prohibit underage consumption of alcoholic beverages.[8] Data on the state and local levels may provide insight into the nature and scope of underage drinking, and this insight may help state and local public health authorities to better understand and address the needs in their communities.

This issue of *The CBHSQ Report* presents estimates of past month binge drinking among people aged 12 to 20 (i.e., underage) based on combined 2010–2012 and 2012–2014 National Survey on Drug Use and Health (NSDUH) data. NSDUH national, state, and substate estimates of underage alcohol use can help address policymaker and prevention specialists' needs for more localized information on underage drinking. NSDUH is an annual survey of the U.S. civilian, noninstitutionalized population aged 12 years or older. One of NSDUH's strengths is the stability of its survey design, which allows for multiple years of data to be combined to examine the state and substate (e.g., local) estimates of underage binge drinking and changes across time.

In the 2010–2014 NSDUHs, binge drinking is defined as having five or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days (i.e., past month). This report presents NSDUH estimates of past month underage binge drinking across four levels: (1) the nation, (2) census regions (i.e., South, Midwest, West, and Northeast), (3) states (i.e., 50 states and the District of Columbia), and (4) substate regions (i.e., 362 substate regions). This report also compares estimates of underage binge drinking in 2010–2012 and 2012–2014. All changes across time that are discussed in this report are statistically significant at the .05 level. Findings in this report are annual averages based on combined 2012–2014 NSDUH data from approximately 84,700 respondents aged 12 to 20. Estimates were derived from a complex statistical model (i.e., small area estimation) in which substate data from NSDUH were combined with other local area data to enhance statistical power and analytic capability.[9]

NATIONAL, REGIONAL, AND STATE ESTIMATES

In this section, estimates of past month binge drinking among people aged 12 to 20 are presented in Figure 1 and Table 1 for the nation, census regions, and the 50 states and the District of Columbia. In Table 1, state estimates of underage past month binge drinking are shown to two decimal places and are ordered from highest to lowest percentage of the population with past month binge drinking. To produce the map in Figure 1, the states that were presented in Table 1 from highest to lowest were divided into quintiles (fifths).[10] A state having a higher or lower estimate does not imply that the estimate is significantly higher or lower than the next highest or lowest estimate. When comparing two estimates, overlapping 95 percent confidence intervals do not imply that the estimates are statistically equivalent at the 5 percent level of significance.[11]

National Estimate of Underage Binge Drinking

National estimates of underage binge drinking provide the overall context for understanding this issue. Based on combined 2012–2014 NSDUH data, an annual average of 5.5 million people aged 12 to 20 in the U.S. engaged in binge drinking in the past month. Nationally, 14.44 percent of all people aged 12 to 20 engaged in binge drinking in the past month. Among states, estimates of past month underage binge drinking ranged from 10.98 percent in Utah to 21.42 percent in North Dakota (Figure 1; Table 1).

Regional Estimates of Underage Binge Drinking

The combined 2012–2014 NSDUH data confirms that underage drinking occurs in every U.S. census region. Across the census regions, estimates of past month binge drinking among people aged 12 to 20 were 16.49 percent in the Northeast, 15.47 percent in the Midwest, 14.25 percent in the West, and 13.02 percent in the South (Table 1).[12]

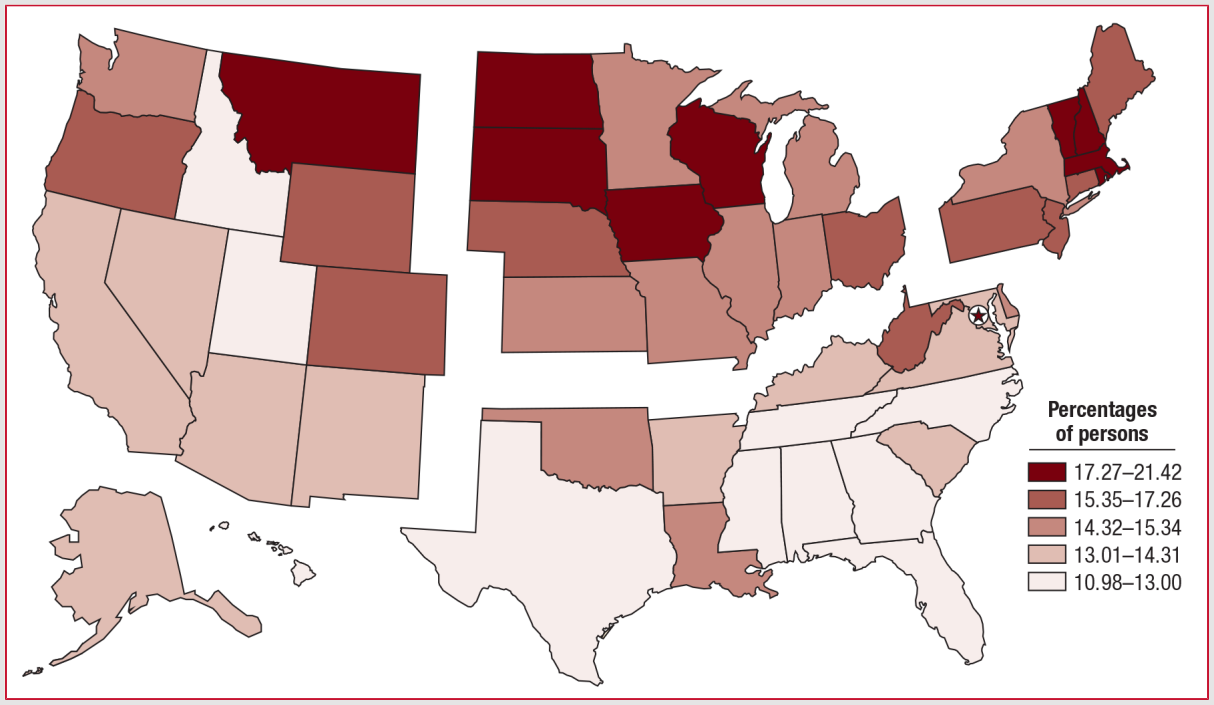
The census regions represent large groupings of states, and the combined 2012–2014 NSDUH data indicate that underage binge drinking varies within census regions (Table 1). In the Northeast, estimates of past month underage binge drinking ranged from 21.00 percent in New Hampshire to 15.34 percent in New York. In the Midwest, estimates of past month underage binge drinking ranged from 21.42 percent in North Dakota to 14.48 percent in Indiana. In the West, estimates of past month underage binge drinking ranged from 17.33 percent in Montana to 10.98 percent in Utah. In the South, estimates of past month underage binge drinking ranged from 18.03 percent in the District of Columbia to 11.45 percent in Tennessee.

State Estimates of Underage Binge Drinking

As described previously, the 50 states and the District of Columbia were divided into quintiles based on the percentage of the population aged 12 to 20 who engaged in binge drinking in the past month (Figure 1). Based on combined 2012–2014 NSDUH data, there were 10 states in the lowest quintile of estimates of past month underage binge drinking. The 10 states in the lowest quintile were Mississippi (13.00 percent), Texas (12.93 percent), Alabama (12.86 percent), Hawaii (12.78 percent), Florida (12.51 percent), Idaho (12.42 percent), Georgia (12.32 percent), North Carolina (11.65 percent), Tennessee (11.45 percent), and Utah (10.98 percent).

Based on combined 2012–2014 NSDUH data, there were 10 states in the highest quintile of estimates of past month underage binge alcohol use. The 10 states in the highest quintile were North Dakota (21.42 percent), New Hampshire (21.00 percent), Vermont (20.85 percent), Rhode Island (19.90 percent), South Dakota (18.58 percent), Massachusetts (18.19 percent), the District of Columbia (18.03 percent), Iowa (17.62 percent), Wisconsin (17.50 percent), and Montana (17.33 percent).

Figure 1. Underage binge alcohol use in the past month among people aged 12 to 20, by State: percentages, annual averages based on combined 2012 to 2014 NSDUHs



Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

Table 1. Underage binge alcohol use in the past month among people aged 12 to 20: by quintile group: percentages, annual averages based on combined 2012 to 2014 NSDUHs

State	Census region	Percentage of adolescents	Quintile group
North Dakota	Midwest	21.42%	5
New Hampshire	Northeast	21.00%	5
Vermont	Northeast	20.85%	5
Rhode Island	Northeast	19.90%	5
South Dakota	Midwest	18.58%	5
Massachusetts	Northeast	18.19%	5
District of Columbia	South	18.03%	5
Iowa	Midwest	17.62%	5
Wisconsin	Midwest	17.50%	5
Montana	West	17.33%	5
West Virginia	South	17.26%	4
Connecticut	Northeast	17.02%	4
Wyoming	West	16.85%	4
Pennsylvania	Northeast	16.70%	4
Oregon	West	16.56%	4
Maine	Northeast	15.91%	4
New Jersey	Northeast	15.80%	4
Nebraska	Midwest	15.73%	4
Ohio	Midwest	15.66%	4
Colorado	West	15.44%	4
New York	Northeast	15.34%	3
Minnesota	Midwest	15.34%	3
Kansas	Midwest	15.28%	3
Michigan	Midwest	15.05%	3
Oklahoma	South	15.03%	3
Delaware	South	14.99%	3
Louisiana	South	14.86%	3
Washington	West	14.68%	3
Missouri	Midwest	14.65%	3
Illinois	Midwest	14.64%	3
Indiana	Midwest	14.48%	3
Nevada	West	14.31%	2
Arizona	West	14.18%	2
California	West	14.17%	2
Virginia	South	13.91%	2
Kentucky	South	13.79%	2
New Mexico	West	13.56%	2
Maryland	South	13.54%	2
Alaska	West	13.52%	2
Arkansas	South	13.26%	2
South Carolina	South	13.10%	2
Mississippi	South	13.00%	1
Texas	South	12.93%	1
Alabama	South	12.86%	1
Hawaii	West	12.78%	1
Florida	South	12.51%	1
Idaho	West	12.42%	1
Georgia	South	12.32%	1
North Carolina	South	11.65%	1
Tennessee	South	11.45%	1
Utah	West	10.98%	1

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014

CHANGES OVER TIME IN NATIONAL, REGIONAL, AND STATE ESTIMATES

This report also compares the combined 2012–2014 NSDUH state estimates of past month underage binge drinking with 2010–2012 estimates of underage binge drinking to examine changes over time. The 2010–2012 NSDUH data are based on information obtained from approximately 94,200 people aged 12 to 20. The inclusion of a common year (i.e., 2012) in these comparisons increases the precision of the estimates and the ability to detect statistically significant differences between the two periods. Statistically significant differences between 2010–2012 and 2012–2014 NSDUH estimates indicate average annual change between 2010–2011 and 2013–2014. It is not possible to examine changes over time at the substate level because of changes to substate boundaries by the states between 2010–2012 and 2012–2014.

Comparisons of 2010–2012 NSDUH national estimates with 2012–2014 NSDUH national estimates indicate that the nation as a whole experienced a statistically significant decrease in past month underage binge drinking (15.87 to 14.44 percent) (Table 2). Similarly, when 2010–2012 NSDUH region-level estimates of past month underage binge drinking were compared with 2012–2014 NSDUH estimates, all four census regions experienced statistically significant decreases (18.25 to 16.49 percent in the Northeast, 17.19 to 15.47 percent in the Midwest, 14.38 to 13.02 percent in the South, and 15.24 to 14.25 percent in the West) (Table 2).

When the 2010–2012 state estimates were compared with the 2012–2014 NSDUH state estimates, 18 states and the District of Columbia (California, Connecticut, Delaware, Florida, Idaho, Illinois, Iowa, Kentucky, Michigan, Minnesota, Montana, New Jersey, New York, Ohio, Tennessee, Texas, Virginia, and West Virginia) experienced a statistically significant decrease in their estimates of past month underage binge drinking. The remaining 32 states experienced no change in the percentage of past month underage binge drinking (Table 2). No states had significantly higher estimates of underage binge drinking in 2012–2014 compared with 2010–2012.

Table 2. Underage binge alcohol use in the past month among people aged 12 to 20 by state: percentages, annual averages based on combined 2010 to 2012 and combined 2012 to 2014 NSDUHs

State	Annual averages: 2010–2012		Annual averages: 2012–2014	
	Percent	95% Confidence interval	Percent	95% Confidence interval
National*	**15.87**	**(15.41–16.35)**	**14.44**	**(14.01–14.88)**
*Northeast**	18.25	(17.63–18.89)	16.49	(15.80–17.20)
*Midwest**	17.19	(16.71–17.68)	15.47	(14.90–16.06)
*South**	14.38	(13.93–14.85)	13.02	(12.56–13.50)
*West**	15.24	(14.60–15.90)	14.25	(13.62–14.91)
Alabama	13.17	(11.61–14.91)	12.86	(11.27–14.63)
Alaska	14.99	(13.32–16.84)	13.52	(11.84–15.41)
Arizona	14.81	(13.15–16.64)	14.18	(12.47–16.09)
Arkansas	14.78	(13.21–16.51)	13.26	(11.70–15.00)
*California**	15.35	(14.35–16.40)	14.17	(13.21–15.18)
Colorado	15.16	(13.50–16.98)	15.44	(13.66–17.41)
*Connecticut**	19.11	(17.30–21.06)	17.02	(15.19–19.01)
*Delaware**	17.67	(15.81–19.69)	14.99	(13.21–16.96)
*District of Columbia**	20.97	(18.42–23.78)	18.03	(15.51–20.85)
*Florida**	14.24	(13.35–15.19)	12.51	(11.61–13.48)
Georgia	12.49	(11.03–14.10)	12.32	(10.87–13.93)
Hawaii	14.09	(12.37–15.99)	12.78	(10.94–14.87)
*Idaho**	14.19	(12.69–15.84)	12.42	(10.85–14.18)
*Illinois**	17.10	(16.09–18.16)	14.64	(13.51–15.84)
Indiana	15.95	(14.36–17.68)	14.48	(12.88–16.24)
*Iowa**	19.89	(17.98–21.95)	17.62	(15.76–19.66)
Kansas	16.76	(15.10–18.55)	15.28	(13.54–17.19)
*Kentucky**	15.55	(13.91–17.35)	13.79	(12.17–15.58)
Louisiana	14.72	(13.24–16.35)	14.86	(13.17–16.72)
Maine	16.29	(14.64–18.10)	15.91	(14.21–17.78)
Maryland	14.23	(12.69–15.91)	13.54	(11.99–15.25)
Massachusetts	19.24	(17.44–21.19)	18.19	(16.29–20.25)
*Michigan**	16.89	(15.93–17.89)	15.05	(13.98–16.19)
*Minnesota**	17.83	(16.12–19.67)	15.34	(13.69–17.15)
Mississippi	12.59	(11.16–14.18)	13.00	(11.49–14.67)
Missouri	15.32	(13.68–17.13)	14.65	(13.03–16.42)
*Montana**	20.23	(18.35–22.24)	17.33	(15.44–19.39)
Nebraska	17.11	(15.40–18.98)	15.73	(14.05–17.56)
Nevada	15.72	(13.71–17.98)	14.31	(12.52–16.30)
New Hampshire	22.13	(20.23–24.16)	21.00	(19.06–23.07)
*New Jersey**	18.21	(16.36–20.20)	15.80	(14.12–17.65)
New Mexico	14.96	(13.33–16.74)	13.56	(11.97–15.31)
*New York**	17.90	(16.84–19.02)	15.34	(14.22–16.53)
North Carolina	12.83	(11.36–14.45)	11.65	(10.27–13.18)
North Dakota	23.57	(21.35–25.95)	21.42	(19.24–23.78)
*Ohio**	17.61	(16.63–18.63)	15.66	(14.61–16.78)
Oklahoma	14.76	(13.13–16.55)	15.03	(13.39–16.84)
Oregon	16.31	(14.65–18.13)	16.56	(14.76–18.52)
Pennsylvania	17.45	(16.36–18.59)	16.70	(15.62–17.83)
Rhode Island	20.52	(18.53–22.67)	19.90	(17.71–22.28)
South Carolina	14.49	(12.88–16.25)	13.10	(11.51–14.87)
South Dakota	19.16	(17.36–21.11)	18.58	(16.70–20.61)
*Tennessee**	13.20	(11.68–14.89)	11.45	(9.89–13.22)
*Texas**	14.81	(13.86–15.82)	12.93	(12.00–13.93)
Utah	10.91	(9.43–12.60)	10.98	(9.39–12.80)
Vermont	22.23	(20.15–24.46)	20.85	(18.80–23.07)
*Virginia**	16.68	(14.92–18.59)	13.91	(12.32–15.66)
Washington	15.90	(14.26–17.69)	14.68	(13.02–16.51)
*West Virginia**	20.09	(18.26–22.05)	17.26	(15.38–19.30)
Wisconsin	17.65	(15.89–19.55)	17.50	(15.73–19.42)
Wyoming	18.39	(16.49–20.46)	16.85	(15.04–18.83)

* Difference between the 2010-2012 and 2012-2014 estimate is statistically significant at the 0.05 level.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2010 to 2014.

SUBSTATE REGION ESTIMATES OF UNDERAGE BINGE DRINKING

The combined 2012-2014 NSDUH state and national estimates of binge drinking among people aged 12 to 20 highlight the prevalence of underage drinking. Although state and national estimates of underage binge drinking may be useful for state policymakers, more localized information may further enhance their understanding of the issue of underage drinking in their communities. The Substance Abuse and Mental Health Services Administration (SAMHSA) works with state substance abuse/mental health agency representatives to define substate areas that meet state needs and reporting requirements while ensuring that the NSDUH sample sizes are large enough to provide estimates with adequate precision.[13]

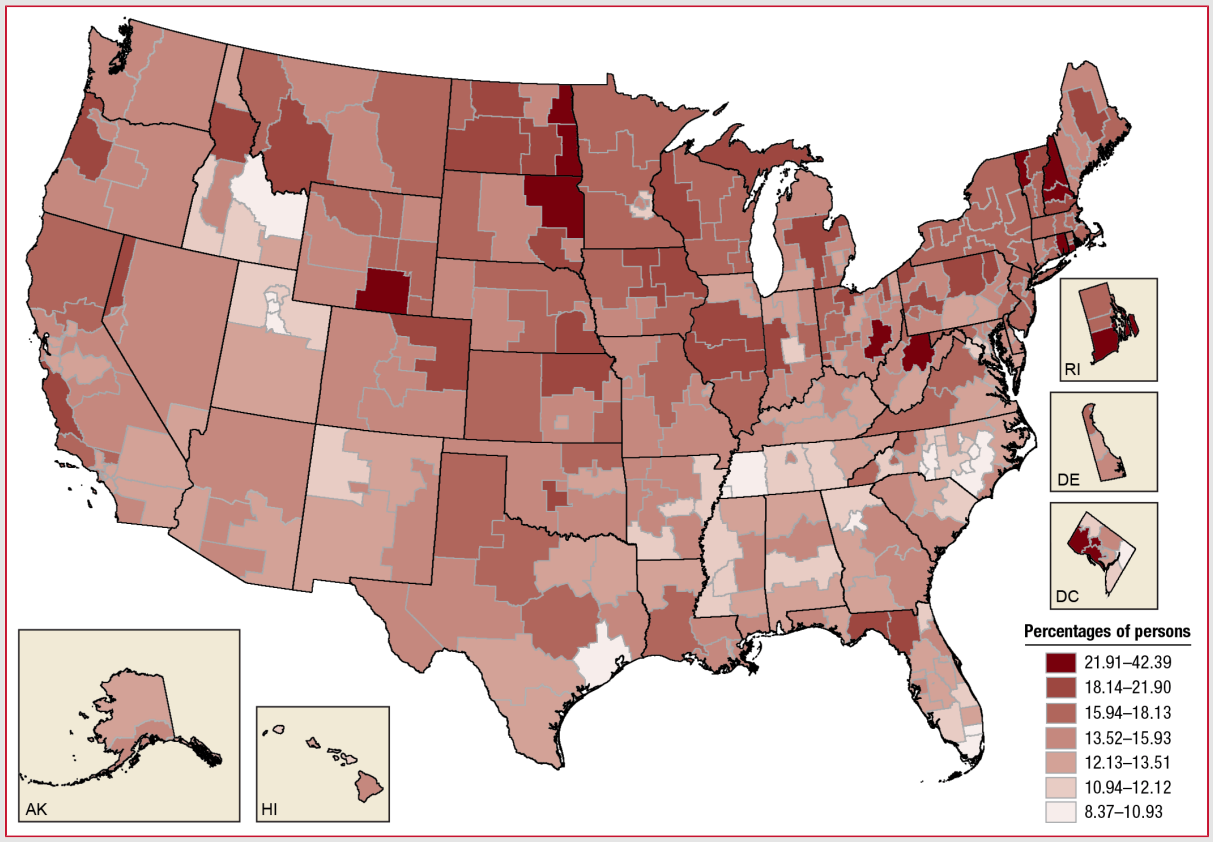
Combined 2012–2014 NSDUH data can be used to estimate past month underage binge drinking in 362 substate regions. The 2012–2014 NSDUH estimates in this report are based on substate boundaries that reflect current state needs and reporting requirements and may not be comparable with estimates from substate regions from prior years. For more information on the substate region definitions used in the NSDUH, see the "2012–2014 National Survey on Drug Use and Health Substate Region Definitions" at http://samhsa.gov/data/. In most states, the substate regions are defined in terms of single counties or groups of counties; however, in some states, the regions are defined entirely in terms of census tracts (in Connecticut, the District of Columbia, and Massachusetts), parishes (in Louisiana), boroughs/census areas (in Alaska), a combination of counties and census tracts (in California and Delaware), and a combination of counties and independent cities (in Maryland, Missouri, Nevada, and Virginia).

Combined 2012–2014 NSDUH substate region estimates of past month binge drinking among people aged 12 to 20 are displayed on a U.S. map (Figure 2). In Table S1, substate region estimates are shown to two decimal places and are listed alphabetically. To produce the substate map in Figure 2, the substate estimates of past year nonmedical use of prescription pain relievers were ordered from highest to lowest percentage and were then divided into three approximately equal groups based on their percentage. There are 121 substate regions in the lowest third (i.e., with the lowest percentages) and there are 121 substate regions in the highest third (i.e., with the highest percentages). There are 120 substate regions in the middle third. The highest and lowest thirds were subdivided into thirds to further distinguish among the substate regions. Overall, the seven groups in each map were constructed to represent a somewhat symmetrical distribution.[14] In some cases, a category could have more or fewer substate regions because two (or more) substate regions have the same estimate (to two decimal places). When such ties occurred at the "boundary" between two groups, all substate regions with the same estimate were assigned to the lower group. Individual state maps at http://samhsa.gov/data/ provide more granularity in areas too small to display clearly on the U.S. maps. Table S1 provides estimates associated with each map. Ninety-five percent confidence intervals are included as a measure of precision for each estimate.[15]

Among the substate regions, the 2012–2014 NSDUH estimates of past month underage binge drinking ranged from 8.37 percent in Shelby County (Tennessee) to 42.39 percent in Ward 2 in the west-central section of the District of Columbia (Figure 2).[16] Of the 16 substate regions with the highest rates of past month underage binge drinking, 7 were in the Northeast (2 in New Hampshire, 2 in Rhode Island, 1 in Vermont, 1 in Connecticut, and 1 in Massachusetts), 4 were in the South (3 in the District of Columbia and 1 in West Virginia), 4 were in the Midwest (2 in North Dakota, 1 in Ohio, and 1 in South Dakota), and 1 was in the West (Wyoming).

Of the 16 substate regions with the lowest rates of past month binge drinking among people aged 12 to 20, there were 12 in the South (4 in North Carolina, 2 in Florida, 2 in Tennessee, 1 in Georgia, 1 in Texas, 1 in Delaware, and 1 in the District of Columbia), and 4 were in the West (3 in Utah and 1 in Idaho).

Figure 2. Underage binge alcohol use in the past month among people aged 12 to 20, by substate region: percentages, annual averages based on combined 2012 to 2014 NSDUHs



Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

WITHIN-STATE VARIATION IN UNDERAGE BINGE DRINKING

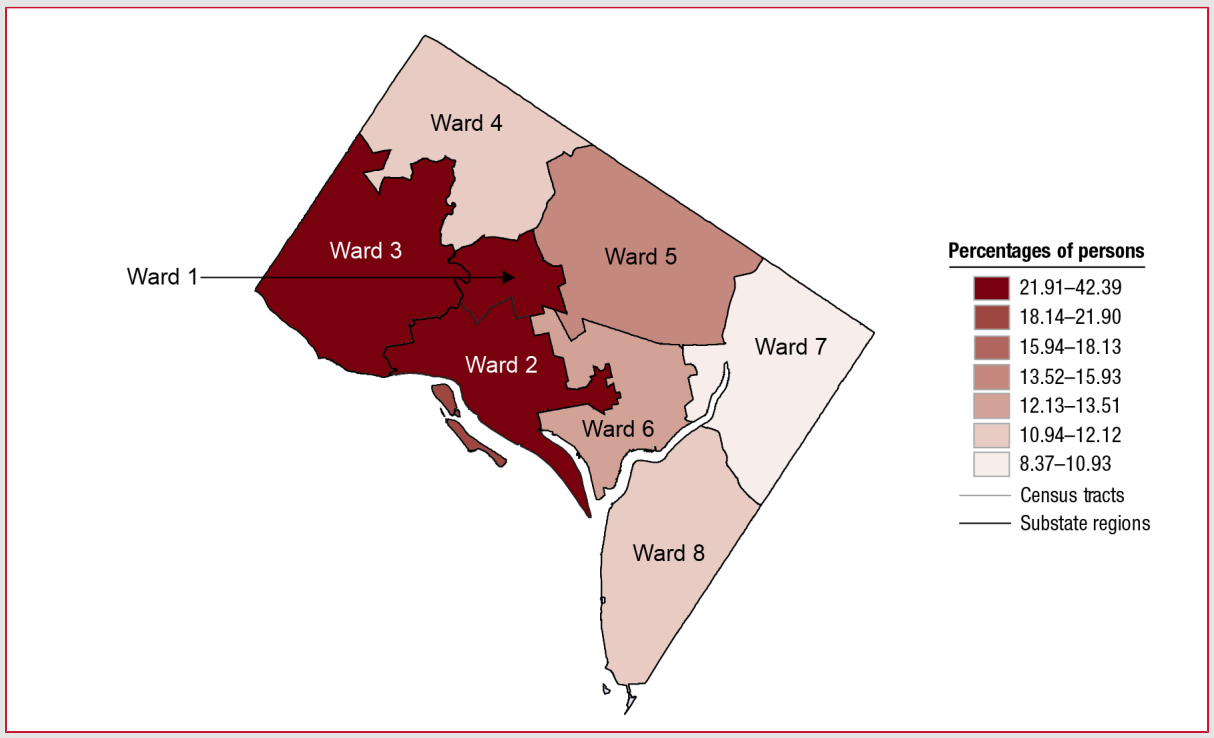
The previous sections examined 2012–2014 NSDUH state and substate past month estimates of underage binge drinking individually. Some substate areas are too small to display clearly on the U.S. national maps (Figure 2); therefore, individual state maps are particularly useful for seeing these small substate areas. SAMHSA produces individual NSDUH state maps that display the substate estimates of past month underage binge drinking. In this section, two of the individual state maps are presented to illustrate the variability within states. For more state-specific NSDUH maps, see http://www.samhsa.gov/data/sites/default/files/NSDUHsubstateStateTabs2014/NSDUHsubstateSpecificStatesTOC2014.htm.

As previously noted, the assignments of the substate areas within states were created by dividing 362 substate regions, nationally, into 7 groups based on their percentages of past month underage binge drinking. Figure 2 shows that states that are in the highest and lowest quintiles tend to have more uniform substate estimates. That is, states with the highest percentages of past month underage binge drinking tend to have substate areas with high percentages of past month underage binge drinking. For example, 5 of the 10 states in the highest quintile of estimates of past month underage binge drinking had substate estimates that were all in the highest third. When all of the substate areas are in the same third, this is a probable indicator of low variability within those states. Estimates were not tested to determine whether they represent significantly higher or lower estimates.

Across the states and the District of Columbia, the most variability in substate estimates occurred within states in the middle quintile. Stated another way, the states in the middle third in Figure 1 had the most variation at the substate level in Figure 2. Of the 11 states in the middle quintile, 9 states had substate-level estimates of past month underage binge drinking that were in the highest, middle, and lowest third, which may indicate more variability. An example of this variability can be seen in small areas such as the District of Columbia (Figure 3) and large areas such as Texas (Figure 4).

In the District of Columbia, the 2012–2014 NSDUH estimates of past month underage binge drinking ranged from 42.39 percent in Ward 2 to 10.85 percent in Ward 7 (Figure 4). Higher percentages of underage binge drinking occurred in Ward 2 (42.39 percent), Ward 3 (24.80 percent) and Ward 1 (23.61 percent). Lower percentages of underage binge drinking occurred in Ward 7 (10.85 percent), Ward 4 (11.78 percent), Ward 8 (11.99 percent), and Ward 6 (12.38 percent). Ward 5 (15.85 percent) fell in the middle third.

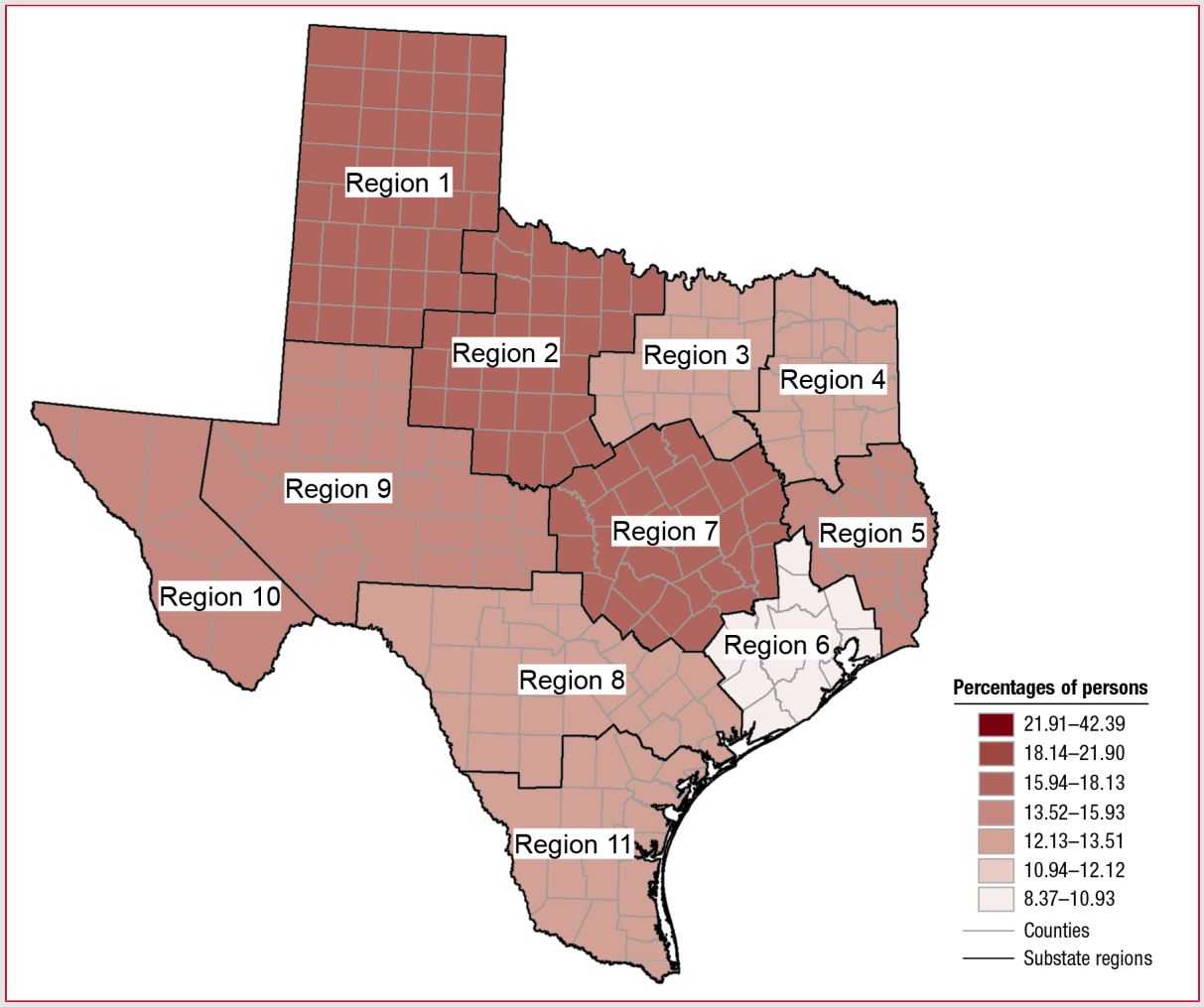
Figure 3. Binge alcohol use in the past month among people aged 12 to 20 in the District of Columbia, by substate region: percentages, annual averages based on combined 2012 to 2014 NSDUHs



Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

In Texas, the 2012–2014 NSDUH estimates of past month binge alcohol use among people aged 12 to 20 ranged from 17.67 percent in Region 2 to 10.57 percent in Region 6. In Texas, higher percentages of underage binge drinking occurred in Region 2 (17.67 percent), Region 1 (16.84 percent), and Region 7 (16.67 percent). Lower percentages of underage binge drinking occurred in Region 6 (10.57 percent), Region 11 (12.32 percent), Region 3 (12.37 percent), Region 8 (12.62 percent), and Region 4 (12.89 percent). The remaining 3 regions (Regions 9, 5, and 10) fell in the middle third.

Figure 4. Binge alcohol use in the past month among people aged 12 to 20 in Texas, by substate region: percentages, annual averages based on combined 2012 to 2014 NSDUHs



Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

As previously mentioned, the maps of the 2012–2014 NSDUH substate estimates of past month binge alcohol use among people aged 12 to 20 in the District of Columbia (Figure 3) and Texas (Figure 4) are examples of the individual state maps produced using the combined 2012-2014 NSDUH data. The state-specific NSDUH maps for the remaining states are available on the following website: http://www.samhsa.gov/data/sites/default/files/NSDUHsubstateStateTabs2014/NSDUHsubstateSpecificStatesTOC2014.htm.

DISCUSSION

Each year, thousands of adolescents and young adults engage in underage drinking, which negatively affects their health and can lead to emergency department visits for alcohol-related illnesses, injuries, and other problems.[17] For many youths, excessive drinking results in premature mortality, with traffic crashes accounting for 36 percent of the alcohol-attributable deaths for those younger than 21.[18] This issue of *The CBHSQ Report* showed that NSDUH estimates of underage binge drinking among people aged 12 to 20 in the United States have declined in the nation as a whole, in the 4 census regions, and in 18 states plus the District of Columbia between 2010–2012 and 2012–2014. Monitoring trends in underage drinking remains a concern across the states and in the nation as a whole because of the health risks associated with this behavior.[1,2,3]

In addition, this report also illustrates that the extent of underage drinking also varied within states. Although it is not possible to monitor trends in underage drinking at the substate level because of changing definitions of substate regions, the estimates of underage drinking at the substate level enable policymakers to contrast their state- and substate-level information to help inform needs assessments in their communities. The maps in this report identify substate underage binge drinking levels for people aged 12 to 20 to help state policymakers and prevention specialists quickly see if there are locations in their state where this behavior is more common.

Reducing binge drinking among youths and adults is an ongoing challenge for the nation as a whole and for the states individually. As states continue to examine their laws and social norms regarding underage drinking, including social hosting laws, monitoring state-level trends in underage binge drinking may also help state and local policymakers plan for and allocate resources to address underage drinking. This report may be used as a tool to gather more information in shaping the story of binge drinking in youth populations. This example can be applied to many other problems that the United States is facing while trying to reach its goal of minimizing alcohol-related injuries and deaths among youths. For more information on underage drinking prevention, see the following websites:

- http://www.surgeongeneral.gov/priorities/prevention/strategy/preventing-abuse.pdf
- http://www.surgeongeneral.gov/library/calls/underage-drinking-community-guide.pdf

Other NSDUH Substate Measures

The combined 2012–2014 NSDUH estimates for past month underage binge drinking for people aged 12 to 20 are available, along with 25 additional behavioral health measures for 384 substate areas, 50 states and the District of Columbia, 4 census regions, and the United States. Information on the methodology that generated these estimates is available online at http://samhsa.gov/data/. This report discusses one of the measures for the 362 substate areas displayed on the maps. The 25 additional measures include substance use and mental health issues, including use of illicit drugs (e.g., marijuana use, cocaine use, nonmedical use of prescription pain relievers), alcohol, and tobacco; substance use disorders; needing but not receiving treatment for a substance use problem; any mental illness, serious mental illness; depression; and suicidal thoughts. Also provided are national maps for all measures and detailed tables including percentages for each substate region, state, census region, and the nation for people aged 12 or older; tables by age group; and state-specific tables and maps. The state maps are particularly useful in areas too small to display clearly on the U.S. maps.

ENDNOTES

1. Windle, M. (2016). Drinking over the lifespan: Focus on early adolescents and youth. *Alcohol Research: Current Reviews, 38*(1), 95–101.
2. Cservenka, A., Jones, S. A., & Nigel, B. J. (2015, December). Reduced cerebellar brain activity during reward processing in adolescent binge drinkers. *Developmental Cognitive Neuroscience, 16*, 110–120.
3. Grunbaum, J. A., Kann, L., Kinchen, S., Ross, J., Hawkins, J., Lowry, R., et al. (2004). Youth risk behavior surveillance—United States, 2003. *Morbidity and Mortality Weekly Report Surveillance Summary, 53*(SS02), 1–96. Erratum in *MMWR*, June 25; 53: 536, 2004. Erratum in *MMWR,* June 24; 54: 608, 2005.
4. Healthy People 2020 does not have a goal specific to reducing underage drinking for people aged 12 to 20 as a group; however, it does have goals for adolescents & college students. For more information see https://www.healthypeople.gov/2020/leading-health-indicators/2020-lhi-topics/Substance-Abuse.
5. Center for Behavioral Health Statistics and Quality. (2015). *Behavioral health trends in the United States: Results from the 2014 National Survey on Drug Use and Health* (HHS Publication No. SMA 15-4927, NSDUH Series H-50). Retrieved from http://samhsa.gov/data/
6. Center for Disease Control and Prevention. (2016). *Fact sheets – underage drinking*. Retrieved from http://www.cdc.gov/alcohol/fact-sheets/underage-drinking.htm
7. Dixon, M. A., & Chartier, K. G. (2016). Alcohol use patterns among urban and rural residents: Demographic and social influences. *Alcohol Research: Current Reviews, 38*(1), 69–77
8. Alcohol Policy Information System, National Institute on Alcohol Abuse and Alcoholism. (2009, September 28). *State profiles of underage drinking laws*. Retrieved from http://www.alcoholpolicy.niaaa.nih.gov/state_profiles_of_underage_drinking_laws.html
9. Estimates presented in this report are derived from a hierarchical Bayes model-based small area estimation (SAE) procedure in which NSDUH data at the substate level are combined with local area county and census block group/tract-level data from the area to provide more precise estimates of substance use and mental health outcomes. The precision of the SAE estimates can be improved significantly by combining data across 3 years (i.e., 2012 to 2014). With 3 years of combined NSDUH data, the sample sizes in the 362 substate regions ranged from 100 people to approximately 3,500 people.
10. In some cases, a "quintile" could have more or fewer states than desired because two (or more) states have the same estimate (to two decimal places). When such ties occurred at the "boundary" between two quintiles, all states with the same estimate were assigned to the lower quintile.
11. In this report, state estimates are discussed in terms of their observed rankings because they provide useful context. However, a state having a highest or lowest rate does not imply that the state's rate is significantly higher or lower than the rate of the next highest or lowest state. Similarly, the quintiles were not selected to represent statistical differences across quintiles or to correspond to proximity to a target public health threshold for a particular measure. For example, the division of states into quintiles does not indicate that states in the same quintile are statistically similar to each other. While a nearly equal number of states are contained in each quintile, the size of the intervals (i.e., the difference between the upper and lower limits of each quintile) that define the map boundaries is not necessarily uniform across each quintile." When comparing two state prevalence rates, the method of overlapping confidence intervals is more conservative (i.e., it rejects the null hypothesis of no difference less often) than the standard method based on Z statistics when the null hypothesis is true. Even if confidence intervals for two states overlap, the two estimates may be declared significantly different by the test based on Z statistics. Hence, the method of overlapping confidence intervals is not recommended to test the difference of two state estimates. A detailed description of the method of overlapping confidence intervals and its comparison with the standard methods for testing of a hypothesis is given in the following articles: (a) Schenker, N., & Gentleman, J. F. (2001). On judging the significance of differences by examining the overlap between confidence intervals. *American Statistician, 55*(3), 182–186. (b) Payton, M. E., Greenstone, M. H., & Schenker, N. (2003). Overlapping confidence intervals or standard error intervals: What do they mean in terms of statistical significance? *Journal of Insect Science, 3*, 34. For details on a more accurate test to compare state prevalence estimates, please see Section B.12 in Appendix B of *2011-2012 National Survey on Drug Use and Health: Guide to state tables and summary of small area estimation methodology*, located at http://www.samhsa.gov/data/NSDUH/2k12State/NSDUHsae2012/Index.aspx.
12. The West has 13 states: AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, and WY. The South has 16 states plus the District of Columbia: AL, AR, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, and WV. The Northeast has 9 states: CT, MA, ME, NH, NJ, NY, PA, RI, and VT. The Midwest has 12 states: IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, and WI.
13. Substance use and mental health officials from each of the 50 states and the District of Columbia typically define these substate areas to correspond to areas reported in their applications for the Substance Abuse Prevention and Treatment Block Grant (SABG) administered by SAMHSA. The SABG program provides financial and technical assistance to the 50 states, the District of Columbia, and other jurisdictions to support substance abuse prevention and treatment programs and to promote public health. States use NSDUH substate estimates for a variety of purposes, including strategic planning and program development, production of epidemiological profiles for briefing state legislatures and informing the public, allocation of funds to areas based on the need for services, and other uses.

14. The seven categories were not selected to represent statistical differences across categories or to correspond to proximity to a target public health threshold for a particular measure. For example, the division of substate regions into seven categories does not indicate that substate regions in the same category are statistically similar to each other. Furthermore, the size of the intervals (i.e., the difference between the upper and lower limits of each category) that define the map boundaries is not necessarily uniform across each category. The substate areas are uniquely defined based on the needs of each state and may not be demographically or geographically comparable to substate areas in other states.

15. When comparing two substate region percentages, the method of overlapping confidence intervals is more conservative (i.e., it rejects the null hypothesis of no difference less often) than the standard method based on Z statistics when the null hypothesis is true. Even if confidence intervals for two substate regions overlap, the two estimates may be declared significantly different by the test based on Z statistics. Hence, the method of overlapping confidence intervals is not recommended to test the difference of two substate region estimates. As percentages are standardized, they do not inform a reader when two states or substates have the same percentage but different population sizes.

16. Ward 2 includes census tracts primarily in the west-central part of the District of Columbia.

17. Office of Applied Studies. (2010). *The DAWN Report: Emergency department visits involving underage alcohol use: 2008*. Rockville, MD: Substance Abuse and Mental Health Services Administration.

18. Stahre, M., Roeber, J., Kanny, D., Brewer, R. D., & Zhang, X. (2014). Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States. *Preventing Chronic Disease, 11*, 130293.

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Supplemental Table S1: Underage binge alcohol use in the past month among people aged 12 to 20, by substate region: percentages, annual averages based on combined 2012 to 2014 NSDUHs

State	Substate region	Small area estimate	95% CI (lower)	95% CI (upper)	Substate area group
Total United States	**Total United States**	**14.44%**	**14.01%**	**14.88%**	
Northeast	Northeast	16.49%	15.80%	17.20%	
Midwest	Midwest	15.47%	14.90%	16.06%	
South	South	13.02%	12.56%	13.50%	
West	West	14.25%	13.62%	14.91%	
Alabama	**Alabama**	**12.86%**	**11.27%**	**14.63%**	
Alabama	Region 1	12.62%	10.16%	15.57%	3
Alabama	Region 2	13.93%	11.36%	16.97%	4
Alabama	Region 3	11.93%	9.61%	14.73%	2
Alabama	Region 4	12.39%	9.88%	15.41%	3
Alaska	**Alaska**	**13.52%**	**11.84%**	**15.41%**	
Alaska	Anchorage	14.12%	11.72%	16.92%	4
Alaska	Northern	12.81%	10.22%	15.95%	3
Alaska	South Central	13.71%	11.08%	16.84%	4
Alaska	Southeast	12.18%	9.46%	15.55%	3
Arizona	**Arizona**	**14.18%**	**12.47%**	**16.09%**	
Arizona	Maricopa	14.43%	12.26%	16.91%	4
Arizona	Pima	15.03%	11.88%	18.84%	4
Arizona	Rural North	14.01%	10.98%	17.72%	4
Arizona	Rural South	12.29%	9.54%	15.69%	3
Arkansas	**Arkansas**	**13.26%**	**11.70%**	**15.00%**	
Arkansas	Catchment Area 1	14.04%	11.37%	17.23%	4
Arkansas	Catchment Area 2	15.30%	12.09%	19.17%	4
Arkansas	Catchment Area 3	12.00%	9.39%	15.20%	2
Arkansas	Catchment Area 4	13.72%	10.87%	17.18%	4
Arkansas	Catchment Area 5	14.69%	11.57%	18.48%	4
Arkansas	Catchment Area 6	13.84%	10.74%	17.65%	4
Arkansas	Catchment Area 7	11.22%	8.61%	14.50%	2
Arkansas	Catchment Area 8	11.49%	9.12%	14.39%	2
California	**California**	**14.17%**	**13.21%**	**15.18%**	
California	Region 1R	18.02%	14.64%	21.98%	5
California	Region 2R	17.53%	14.16%	21.49%	5
California	Region 3R (Sacramento)	13.00%	10.30%	16.29%	3
California	Region 4R	15.67%	12.77%	19.10%	4
California	Region 5R (San Francisco)	17.44%	13.93%	21.61%	5
California	Region 6 (Santa Clara)	12.38%	9.83%	15.48%	3
California	Region 7R (Contra Costa)	12.82%	10.17%	16.03%	3
California	Region 8R (Alameda)	12.87%	10.35%	15.88%	3
California	Region 9R (San Mateo)	14.80%	11.77%	18.44%	4
California	Region 10	17.12%	13.81%	21.02%	5
California	LA SPA 1 and 5	17.05%	13.58%	21.19%	5
California	LA SPA 2	12.58%	10.17%	15.46%	3
California	LA SPA 3	12.48%	9.81%	15.73%	3
California	LA SPA 4	13.93%	10.92%	17.61%	4
California	LA SPA 6	14.46%	11.47%	18.09%	4
California	LA SPA 7	13.13%	10.60%	16.15%	3
California	LA SPA 8	14.22%	11.48%	17.49%	4
California	Region 12R	14.85%	11.62%	18.79%	4
California	Regions 13 and 19R	12.84%	10.80%	15.20%	3
California	Region 14 (Orange)	13.42%	11.11%	16.13%	3
California	Region 15R (Fresno)	14.14%	11.28%	17.58%	4
California	Region 16R (San Diego)	15.49%	12.83%	18.58%	4
California	Region 17R	13.90%	11.23%	17.09%	4
California	Region 18R (San Bernardino)	12.28%	9.97%	15.03%	3
California	Region 20R	13.44%	10.65%	16.83%	3
California	Region 21R	18.91%	15.06%	23.47%	6

(continued)

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

Supplemental Table S1 - continued: Underage binge alcohol use in the past month among people aged 12 to 20, by substate region: percentages, annual averages based on combined 2012 to 2014 NSDUHs

State	Substate region	Small area estimate	95% CI (lower)	95% CI (upper)	Substate area group
Colorado	**Colorado**	**15.44%**	**13.66%**	**17.41%**	
Colorado	Region 1	18.89%	15.30%	23.09%	6
Colorado	Regions 2 and 7	14.78%	12.55%	17.32%	4
Colorado	Region 3	14.26%	11.39%	17.71%	4
Colorado	Region 4	15.77%	12.28%	20.02%	4
Colorado	Regions 5 and 6	15.73%	12.53%	19.56%	4
Connecticut	**Connecticut**	**17.02%**	**15.19%**	**19.01%**	
Connecticut	Eastern	21.93%	17.97%	26.49%	7
Connecticut	North Central	16.13%	13.37%	19.33%	5
Connecticut	Northwestern	14.60%	11.59%	18.25%	4
Connecticut	South Central	17.42%	14.47%	20.83%	5
Connecticut	Southwest	16.50%	13.45%	20.07%	5
Delaware	**Delaware**	**14.99%**	**13.21%**	**16.96%**	
Delaware	Kent	12.90%	10.22%	16.14%	3
Delaware	New Castle (excluding Wilmington City)	16.77%	14.31%	19.55%	5
Delaware	Sussex	13.73%	10.92%	17.13%	4
Delaware	Wilmington City	10.79%	8.22%	14.03%	1
District of Columbia	**District of Columbia**	**18.03%**	**15.51%**	**20.85%**	
District of Columbia	Ward 1	23.61%	17.83%	30.57%	7
District of Columbia	Ward 2	42.39%	35.05%	50.08%	7
District of Columbia	Ward 3	24.80%	19.69%	30.73%	7
District of Columbia	Ward 4	11.78%	9.03%	15.22%	2
District of Columbia	Ward 5	15.85%	12.13%	20.46%	4
District of Columbia	Ward 6	12.38%	9.30%	16.30%	3
District of Columbia	Ward 7	10.85%	8.07%	14.44%	1
District of Columbia	Ward 8	11.99%	9.19%	15.48%	2
Florida	**Florida**	**12.51%**	**11.61%**	**13.48%**	
Florida	Broward (Circuit 17)	10.10%	8.17%	12.42%	1
Florida	Circuit 9	12.24%	10.15%	14.69%	3
Florida	Circuit 18	13.00%	10.50%	15.98%	3
Florida	Circuit 6	13.19%	10.78%	16.03%	3
Florida	Circuit 10	13.12%	10.43%	16.37%	3
Florida	Circuit 12	12.20%	9.58%	15.40%	3
Florida	Circuit 13 (Hillsborough)	13.69%	11.30%	16.50%	4
Florida	Circuit 20	11.43%	9.02%	14.37%	2
Florida	Circuit 4	11.41%	9.18%	14.09%	2
Florida	Circuit 5	13.51%	11.06%	16.40%	3
Florida	Circuit 7	14.46%	11.77%	17.64%	4
Florida	Circuit 8 plus Columbia, Dixie, Hamilton, Lafayette, and Suwannee	19.36%	15.74%	23.58%	6
Florida	Circuit 1	14.14%	11.29%	17.57%	4
Florida	Circuit 2 plus Madison and Taylor	19.46%	15.84%	23.67%	6
Florida	Circuit 14	12.15%	9.50%	15.42%	3
Florida	South (Circuits 11 and 16)	9.78%	8.18%	11.64%	1
Florida	Circuit 15 (Palm Beach)	12.50%	10.22%	15.19%	3
Florida	Circuit 19	12.07%	9.40%	15.38%	2
Georgia	**Georgia**	**12.32%**	**10.87%**	**13.93%**	
Georgia	Region 1	11.91%	9.67%	14.58%	2
Georgia	Region 2	14.42%	11.41%	18.06%	4
Georgia	Region 3	10.51%	8.53%	12.88%	1
Georgia	Region 4	13.45%	10.39%	17.24%	3
Georgia	Region 5	14.43%	11.33%	18.20%	4
Georgia	Region 6	12.53%	10.00%	15.59%	3
Hawaii	**Hawaii**	**12.78%**	**10.94%**	**14.87%**	
Hawaii	Hawaii Island	14.07%	11.06%	17.74%	4
Hawaii	Honolulu	12.73%	10.57%	15.26%	3
Hawaii	Kauai	11.57%	8.82%	15.02%	2
Hawaii	Maui	12.00%	9.34%	15.30%	2

(continued)

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

Supplemental Table S1 - continued: Underage binge alcohol use in the past month among people aged 12 to 20, by substate region: percentages, annual averages based on combined 2012 to 2014 NSDUHs

State	Substate region	Small area estimate	95% CI (lower)	95% CI (upper)	Substate area group
Idaho	**Idaho**	**12.42%**	**10.85%**	**14.18%**	
Idaho	Region 1	12.43%	9.69%	15.81%	3
Idaho	Region 2	18.20%	14.09%	23.19%	6
Idaho	Region 3	11.13%	8.71%	14.11%	2
Idaho	Region 4	13.80%	11.12%	16.99%	4
Idaho	Region 5	11.08%	8.59%	14.19%	2
Idaho	Region 6	12.82%	9.93%	16.41%	3
Idaho	Region 7	10.17%	7.81%	13.14%	1
Illinois	**Illinois**	**14.64%**	**13.51%**	**15.84%**	
Illinois	Region I (Cook)	13.64%	11.97%	15.51%	4
Illinois	Region II	13.10%	11.51%	14.88%	3
Illinois	Region III	18.80%	16.06%	21.89%	6
Illinois	Region IV	18.50%	15.60%	21.80%	6
Illinois	Region V	16.52%	13.89%	19.53%	5
Indiana	**Indiana**	**14.48%**	**12.88%**	**16.24%**	
Indiana	Central	11.17%	8.87%	13.98%	2
Indiana	East	16.45%	13.00%	20.60%	5
Indiana	North Central	13.48%	10.86%	16.62%	3
Indiana	Northeast	14.53%	11.52%	18.17%	4
Indiana	Northwest	12.91%	10.21%	16.20%	3
Indiana	Southeast	14.43%	11.40%	18.11%	4
Indiana	Southwest	15.70%	12.48%	19.56%	4
Indiana	West	21.90%	17.80%	26.63%	6
Iowa	**Iowa**	**17.62%**	**15.76%**	**19.66%**	
Iowa	Central	15.12%	12.27%	18.50%	4
Iowa	North Central	21.31%	17.27%	26.00%	6
Iowa	Northeast	18.38%	15.19%	22.06%	6
Iowa	Northwest	17.40%	14.12%	21.27%	5
Iowa	Southeast	17.73%	14.53%	21.46%	5
Iowa	Southwest	15.83%	12.82%	19.40%	4
Kansas	**Kansas**	**15.28%**	**13.54%**	**17.19%**	
Kansas	Kansas City Metro	14.53%	11.95%	17.55%	4
Kansas	Northeast	18.56%	15.26%	22.37%	6
Kansas	South Central	13.65%	10.77%	17.16%	4
Kansas	Southeast	16.73%	12.98%	21.30%	5
Kansas	West	16.90%	13.42%	21.06%	5
Kansas	Wichita (Sedgwick)	12.58%	10.00%	15.71%	3
Kentucky	**Kentucky**	**13.79%**	**12.17%**	**15.58%**	
Kentucky	Adanta, Cumberland River, and Lifeskills	13.23%	10.36%	16.74%	3
Kentucky	Bluegrass, Comprehend, and North Key	15.60%	12.92%	18.72%	4
Kentucky	Communicare and River Valley	12.59%	9.94%	15.82%	3
Kentucky	Four Rivers and Pennyroyal	13.54%	10.52%	17.26%	4
Kentucky	Kentucky River, Mountain, and Pathways	13.27%	10.33%	16.90%	3
Kentucky	Seven Counties	12.69%	10.22%	15.65%	3
Louisiana	**Louisiana**	**14.86%**	**13.17%**	**16.72%**	
Louisiana	Region 1	13.83%	10.61%	17.82%	4
Louisiana	Region 10 (Jefferson)	13.07%	10.16%	16.65%	3
Louisiana	Regions 2 and 9	15.72%	13.19%	18.64%	4
Louisiana	Region 3	14.54%	11.42%	18.33%	4
Louisiana	Regions 4, 5, and 6	16.28%	13.38%	19.67%	5
Louisiana	Regions 7 and 8	13.16%	10.53%	16.33%	3
Maine	**Maine**	**15.91%**	**14.21%**	**17.78%**	
Maine	Aroostook	14.60%	11.36%	18.57%	4
Maine	Downeast	16.71%	13.22%	20.89%	5
Maine	Central	14.26%	11.35%	17.75%	4
Maine	Cumberland	15.77%	12.93%	19.09%	4
Maine	Midcoast	14.40%	11.32%	18.16%	4
Maine	Penquis	20.97%	16.98%	25.60%	6
Maine	Western	15.93%	12.74%	19.74%	4
Maine	York	13.94%	11.31%	17.06%	4

(continued)

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

Supplemental Table S1 - continued: Underage binge alcohol use in the past month among people aged 12 to 20, by substate region: percentages, annual averages based on combined 2012 to 2014 NSDUHs

State	Substate region	Small area estimate	95% CI (lower)	95% CI (upper)	Substate area group
Maryland	**Maryland**	**13.54%**	**11.99%**	**15.25%**	
Maryland	Anne Arundel	15.45%	12.24%	19.32%	4
Maryland	Baltimore City	12.35%	9.49%	15.93%	3
Maryland	Baltimore County	15.21%	12.13%	18.90%	4
Maryland	Montgomery	11.11%	8.70%	14.08%	2
Maryland	North Central	13.59%	10.61%	17.25%	4
Maryland	Northeast	15.00%	11.93%	18.70%	4
Maryland	Prince George's	11.67%	9.09%	14.85%	2
Maryland	South	13.12%	10.25%	16.64%	3
Maryland	West	16.84%	13.65%	20.59%	5
Massachusetts	**Massachusetts**	**18.19%**	**16.29%**	**20.25%**	
Massachusetts	Boston	24.57%	19.94%	29.88%	7
Massachusetts	Central	16.80%	13.48%	20.73%	5
Massachusetts	Metrowest	17.19%	14.05%	20.86%	5
Massachusetts	Northeast	17.16%	14.04%	20.80%	5
Massachusetts	Southeast	17.62%	14.67%	21.02%	5
Massachusetts	Western	17.77%	14.43%	21.69%	5
Michigan	**Michigan**	**15.05%**	**13.98%**	**16.19%**	
Michigan	Region 1	21.14%	17.42%	25.40%	6
Michigan	Region 2	14.25%	11.51%	17.52%	4
Michigan	Region 3	13.76%	11.51%	16.37%	4
Michigan	Region 4	13.08%	10.66%	15.96%	3
Michigan	Region 5	18.57%	16.02%	21.41%	6
Michigan	Region 6	18.13%	15.50%	21.09%	5
Michigan	Region 7	13.32%	11.39%	15.52%	3
Michigan	Region 8	13.43%	11.29%	15.91%	3
Michigan	Region 9	13.84%	11.54%	16.50%	4
Michigan	Region 10	13.80%	11.37%	16.64%	4
Minnesota	**Minnesota**	**15.34%**	**13.69%**	**17.15%**	
Minnesota	Regions 1 and 2	18.03%	14.54%	22.14%	5
Minnesota	Regions 3 and 4	16.57%	13.56%	20.10%	5
Minnesota	Regions 5 and 6	17.62%	14.30%	21.51%	5
Minnesota	Region 7A (Hennepin)	14.53%	11.78%	17.80%	4
Minnesota	Region 7B (Ramsey)	15.90%	12.57%	19.90%	4
Minnesota	Region 7C	11.93%	9.68%	14.63%	2
Mississippi	**Mississippi**	**13.00%**	**11.49%**	**14.67%**	
Mississippi	Region 1	13.06%	10.39%	16.28%	3
Mississippi	Region 2	11.55%	9.09%	14.56%	2
Mississippi	Region 3	15.19%	12.16%	18.81%	4
Mississippi	Region 4	11.32%	9.03%	14.10%	2
Mississippi	Region 5	11.63%	8.90%	15.04%	2
Mississippi	Region 6	13.35%	10.58%	16.71%	3
Mississippi	Region 7	14.21%	11.26%	17.78%	4
Missouri	**Missouri**	**14.65%**	**13.03%**	**16.42%**	
Missouri	Central	17.76%	14.58%	21.46%	5
Missouri	Eastern (St. Louis City and County)	12.28%	9.80%	15.27%	3
Missouri	Eastern (excluding St. Louis)	15.37%	12.24%	19.12%	4
Missouri	Northwest (Jackson)	13.54%	10.68%	17.03%	4
Missouri	Northwest (excluding Jackson)	14.59%	11.51%	18.32%	4
Missouri	Southeast	15.54%	12.50%	19.17%	4
Missouri	Southwest	14.43%	11.52%	17.92%	4
Montana	**Montana**	**17.33%**	**15.44%**	**19.39%**	
Montana	Region 1	16.92%	13.58%	20.87%	5
Montana	Region 2	15.56%	12.42%	19.33%	4
Montana	Region 3	14.16%	11.47%	17.35%	4
Montana	Region 4	20.02%	16.56%	24.01%	6
Montana	Region 5	18.07%	15.38%	21.11%	5

(continued)

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

Supplemental Table S1 - continued: Underage binge alcohol use in the past month among people aged 12 to 20, by substate region: percentages, annual averages based on combined 2012 to 2014 NSDUHs

State	Substate region	Small area estimate	95% CI (lower)	95% CI (upper)	Substate area group
Nebraska	**Nebraska**	**15.73%**	**14.05%**	**17.56%**	
Nebraska	Region 1	15.93%	12.40%	20.23%	4
Nebraska	Region 2	15.37%	12.07%	19.39%	4
Nebraska	Region 3	16.39%	13.19%	20.20%	5
Nebraska	Region 4	16.52%	13.18%	20.49%	5
Nebraska	Region 5	18.35%	15.29%	21.85%	6
Nebraska	Region 6	13.80%	11.50%	16.48%	4
Nevada	**Nevada**	**14.31%**	**12.52%**	**16.30%**	
Nevada	Clark - Region 1	13.03%	10.97%	15.42%	3
Nevada	Capital District	15.63%	12.04%	20.06%	4
Nevada	Rural/Frontier	15.54%	12.16%	19.65%	4
Nevada	Washoe - Region 2	19.20%	15.87%	23.04%	6
New Hampshire	**New Hampshire**	**21.00%**	**19.06%**	**23.07%**	
New Hampshire	Central	23.60%	20.82%	26.63%	7
New Hampshire	Northern	27.08%	23.00%	31.60%	7
New Hampshire	Southern	18.36%	16.06%	20.90%	6
New Jersey	**New Jersey**	**15.80%**	**14.12%**	**17.65%**	
New Jersey	Central	16.10%	13.41%	19.21%	5
New Jersey	Metropolitan	13.96%	11.32%	17.09%	4
New Jersey	Northern	16.76%	14.05%	19.87%	5
New Jersey	Southern	16.28%	13.51%	19.48%	5
New Mexico	**New Mexico**	**13.56%**	**11.97%**	**15.31%**	
New Mexico	Region 1	11.61%	9.21%	14.53%	2
New Mexico	Region 2	12.66%	9.95%	15.97%	3
New Mexico	Region 3 (Bernalillo)	15.12%	12.54%	18.12%	4
New Mexico	Region 4	14.88%	11.94%	18.40%	4
New Mexico	Region 5	12.99%	10.24%	16.36%	3
New York	**New York**	**15.34%**	**14.22%**	**16.53%**	
New York	Region A	13.32%	11.93%	14.85%	3
New York	Region B	16.29%	14.49%	18.26%	5
New York	Region C	16.54%	14.86%	18.36%	5
New York	Region D	18.05%	15.81%	20.53%	5
North Carolina	**North Carolina**	**11.65%**	**10.27%**	**13.18%**	
North Carolina	Alliance Behavioral Healthcare 1	9.59%	7.39%	12.37%	1
North Carolina	Alliance Behavioral Healthcare 2	11.92%	9.34%	15.10%	2
North Carolina	Cardinal Innovations Healthcare Solutions 1	10.10%	7.78%	13.00%	1
North Carolina	Cardinal Innovations Healthcare Solutions 2	12.19%	9.41%	15.66%	3
North Carolina	Cardinal Innovations Healthcare Solutions 3	10.93%	8.43%	14.04%	1
North Carolina	CenterPoint Human Services	11.22%	8.63%	14.47%	2
North Carolina	Eastpointe	8.60%	6.56%	11.18%	1
North Carolina	Partners Behavioral Health Management	12.38%	9.83%	15.46%	3
North Carolina	Sandhills Center 1	10.99%	8.38%	14.28%	2
North Carolina	Sandhills Center 2	11.51%	8.83%	14.87%	2
North Carolina	Smoky Mountain Center 1	16.51%	12.92%	20.86%	5
North Carolina	Smoky Mountain Center 2	12.12%	9.27%	15.71%	2
North Carolina	Trillium Healthcare Resources 1	12.45%	9.50%	16.15%	3
North Carolina	Trillium Healthcare Resources 2	15.36%	11.80%	19.74%	4
North Dakota	**North Dakota**	**21.42%**	**19.24%**	**23.78%**	
North Dakota	Badlands and West Central	18.76%	15.59%	22.40%	6
North Dakota	Lake Region	14.26%	11.39%	17.70%	4
North Dakota	North Central	19.43%	15.54%	24.01%	6
North Dakota	Northeast	30.00%	25.25%	35.22%	7
North Dakota	Northwest	16.90%	13.57%	20.84%	5
North Dakota	South Central	20.20%	16.19%	24.91%	6
North Dakota	Southeast	22.92%	19.40%	26.87%	7

(continued)

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

Supplemental Table S1 - continued: Underage binge alcohol use in the past month among people aged 12 to 20, by substate region: percentages, annual averages based on combined 2012 to 2014 NSDUHs

State	Substate region	Small area estimate	95% CI (lower)	95% CI (upper)	Substate area group
Ohio	**Ohio**	**15.66%**	**14.61%**	**16.78%**	
Ohio	Boards 2, 46, 55, and 68	17.01%	13.73%	20.88%	5
Ohio	Boards 3, 52, and 85	14.86%	11.85%	18.48%	4
Ohio	Boards 4 and 78	13.02%	10.26%	16.39%	3
Ohio	Boards 5 and 60	22.47%	18.91%	26.49%	7
Ohio	Boards 7, 15, 41, 79, and 84	14.47%	11.69%	17.79%	4
Ohio	Boards 8, 13, and 83	13.04%	10.53%	16.05%	3
Ohio	Board 9 (Butler)	18.71%	15.40%	22.54%	6
Ohio	Board 12	16.19%	12.80%	20.28%	5
Ohio	Boards 18 and 47	13.85%	11.66%	16.36%	4
Ohio	Boards 20, 32, 54, and 69	16.21%	13.17%	19.79%	5
Ohio	Boards 21, 39, 51, 70, and 80	13.40%	10.93%	16.33%	3
Ohio	Boards 22, 74, and 87	19.20%	15.77%	23.16%	6
Ohio	Boards 23 and 45	15.44%	12.42%	19.02%	4
Ohio	Board 25 (Franklin)	16.01%	13.43%	18.98%	5
Ohio	Boards 27, 71, and 73	14.96%	12.31%	18.07%	4
Ohio	Boards 28, 43, and 67	19.38%	16.35%	22.82%	6
Ohio	Board 31 (Hamilton)	14.40%	11.81%	17.45%	4
Ohio	Board 48 (Lucas)	15.93%	12.89%	19.53%	4
Ohio	Boards 50 and 76	15.64%	12.96%	18.76%	4
Ohio	Board 57 (Montgomery)	14.39%	11.54%	17.80%	4
Ohio	Board 77 (Summit)	16.18%	13.11%	19.79%	5
Oklahoma	**Oklahoma**	**15.03%**	**13.39%**	**16.84%**	
Oklahoma	Central	18.79%	15.19%	23.02%	6
Oklahoma	East Central	12.25%	9.57%	15.54%	3
Oklahoma	Northeast	16.36%	13.34%	19.92%	5
Oklahoma	Northwest and Southwest	15.34%	12.21%	19.10%	4
Oklahoma	Oklahoma County	13.86%	11.07%	17.20%	4
Oklahoma	Southeast	14.33%	11.49%	17.74%	4
Oklahoma	Tulsa County	14.50%	11.57%	18.02%	4
Oregon	**Oregon**	**16.56%**	**14.76%**	**18.52%**	
Oregon	Region 1 (Multnomah)	15.15%	12.25%	18.59%	4
Oregon	Region 2	14.52%	11.88%	17.62%	4
Oregon	Region 3	19.79%	16.80%	23.16%	6
Oregon	Region 4	15.03%	11.85%	18.89%	4
Oregon	Region 5 (Central)	15.12%	11.84%	19.11%	4
Oregon	Region 6 (Eastern)	15.09%	11.70%	19.25%	4
Pennsylvania	**Pennsylvania**	**16.70%**	**15.62%**	**17.83%**	
Pennsylvania	Region 1 (Allegheny)	17.77%	14.95%	20.99%	5
Pennsylvania	Regions 3, 8, 9, and 51	21.68%	18.35%	25.43%	6
Pennsylvania	Regions 4, 11, 37, and 49	15.84%	13.16%	18.95%	4
Pennsylvania	Regions 5, 18, 23, 24, and 46	13.40%	10.82%	16.49%	3
Pennsylvania	Regions 6, 12, 16, 31, 35, 45, and 47	21.48%	17.87%	25.60%	6
Pennsylvania	Regions 7, 13, 20, and 33	16.58%	14.42%	18.99%	5
Pennsylvania	Regions 10, 15, 27, 32, 43, and 44	15.31%	12.32%	18.87%	4
Pennsylvania	Regions 17 and 21	18.41%	15.10%	22.27%	6
Pennsylvania	Regions 19, 26, 28, and 42	13.48%	11.38%	15.90%	3
Pennsylvania	Regions 22, 38, 40, 41, and 48	15.57%	12.76%	18.87%	4
Pennsylvania	Regions 29 and 34	15.61%	12.72%	19.02%	4
Pennsylvania	Regions 30 and 50	18.53%	15.33%	22.23%	6
Pennsylvania	Region 36 (Philadelphia)	16.89%	14.33%	19.81%	5
Rhode Island	**Rhode Island**	**19.90%**	**17.71%**	**22.28%**	
Rhode Island	Bristol and Newport	24.09%	19.94%	28.78%	7
Rhode Island	Kent	16.80%	13.66%	20.49%	5
Rhode Island	Providence	18.09%	15.36%	21.18%	5
Rhode Island	Washington	26.86%	22.14%	32.16%	7
South Carolina	**South Carolina**	**13.10%**	**11.51%**	**14.87%**	
South Carolina	Region 1	13.57%	11.06%	16.54%	4
South Carolina	Region 2	12.45%	10.02%	15.35%	3
South Carolina	Region 3	11.97%	9.53%	14.95%	2
South Carolina	Region 4	13.88%	11.38%	16.82%	4

(continued)

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

Supplemental Table S1 - continued: Underage binge alcohol use in the past month among people aged 12 to 20, by substate region: percentages, annual averages based on combined 2012 to 2014 NSDUHs

State	Substate region	Small area estimate	95% CI (lower)	95% CI (upper)	Substate area group
South Dakota	**South Dakota**	**18.58%**	**16.70%**	**20.61%**	
South Dakota	Region 1	17.36%	14.33%	20.87%	5
South Dakota	Region 2	14.46%	11.47%	18.07%	4
South Dakota	Region 3	23.85%	20.58%	27.46%	7
South Dakota	Region 4	21.24%	17.43%	25.61%	6
South Dakota	Region 5	14.86%	12.18%	18.00%	4
Tennessee	**Tennessee**	**11.45%**	**9.89%**	**13.22%**	
Tennessee	Region 1	12.28%	9.50%	15.74%	3
Tennessee	Region 2	12.56%	9.83%	15.93%	3
Tennessee	Region 3	12.05%	9.38%	15.34%	2
Tennessee	Region 4 (Davidson)	13.81%	10.53%	17.91%	4
Tennessee	Region 5	11.72%	9.24%	14.77%	2
Tennessee	Region 6	10.07%	7.66%	13.13%	1
Tennessee	Region 7 (Shelby)	8.37%	6.38%	10.90%	1
Texas	**Texas**	**12.93%**	**12.00%**	**13.93%**	
Texas	Region 1	16.84%	13.81%	20.37%	5
Texas	Region 2	17.67%	14.01%	22.03%	5
Texas	Region 3	12.37%	10.94%	13.96%	3
Texas	Region 4	12.89%	10.38%	15.90%	3
Texas	Region 5	14.45%	11.49%	18.00%	4
Texas	Region 6	10.57%	9.07%	12.29%	1
Texas	Region 7	16.67%	14.61%	18.97%	5
Texas	Region 8	12.62%	10.49%	15.11%	3
Texas	Region 9	15.31%	12.20%	19.04%	4
Texas	Region 10	14.05%	11.20%	17.47%	4
Texas	Region 11	12.32%	10.44%	14.47%	3
Utah	**Utah**	**10.98%**	**9.39%**	**12.80%**	
Utah	Bear River, Northeastern, Summit, Tooele, and Wasatch	10.95%	8.38%	14.17%	2
Utah	Central, Four Corners, San Juan, and Southwest	12.70%	9.70%	16.46%	3
Utah	Davis County	10.69%	8.21%	13.81%	1
Utah	Salt Lake County	10.65%	8.54%	13.21%	1
Utah	Utah County	10.66%	8.18%	13.77%	1
Utah	Weber, Morgan	11.08%	8.38%	14.50%	2
Vermont	**Vermont**	**20.85%**	**18.80%**	**23.07%**	
Vermont	Champlain Valley	24.35%	21.40%	27.57%	7
Vermont	Rural Northeast	19.69%	16.12%	23.84%	6
Vermont	Rural Southeast	16.16%	13.14%	19.71%	5
Vermont	Rural Southwest	17.84%	14.26%	22.09%	5
Virginia	**Virginia**	**13.91%**	**12.32%**	**15.66%**	
Virginia	Region 1	16.30%	13.40%	19.68%	5
Virginia	Region 2	11.38%	9.15%	14.07%	2
Virginia	Region 3	17.05%	13.86%	20.79%	5
Virginia	Region 4	13.12%	10.38%	16.45%	3
Virginia	Region 5	13.51%	10.95%	16.55%	3
Washington	**Washington**	**14.68%**	**13.02%**	**16.51%**	
Washington	Region 1	15.93%	13.37%	18.88%	4
Washington	Region 2	14.14%	11.96%	16.65%	4
Washington	Region 3	14.42%	12.40%	16.71%	4
West Virginia	**West Virginia**	**17.26%**	**15.38%**	**19.30%**	
West Virginia	Region I	17.97%	13.89%	22.92%	5
West Virginia	Region II	15.39%	12.11%	19.36%	4
West Virginia	Region III	14.61%	11.38%	18.55%	4
West Virginia	Region IV	25.52%	22.07%	29.31%	7
West Virginia	Region V	14.58%	11.88%	17.78%	4
West Virginia	Region VI	12.81%	10.18%	16.01%	3

(continued)

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

Supplemental Table S1 - continued: Underage binge alcohol use in the past month among people aged 12 to 20, by substate region: percentages, annual averages based on combined 2012 to 2014 NSDUHs

State	Substate region	Small area estimate	95% CI (lower)	95% CI (upper)	Substate area group
Wisconsin	**Wisconsin**	**17.50%**	**15.73%**	**19.42%**	
Wisconsin	Milwaukee	15.98%	12.98%	19.52%	5
Wisconsin	Northeastern	17.58%	14.61%	21.02%	5
Wisconsin	Northern	17.71%	14.37%	21.63%	5
Wisconsin	Southeastern	16.51%	13.52%	20.01%	5
Wisconsin	Southern	17.61%	14.47%	21.26%	5
Wisconsin	Western	20.43%	16.83%	24.58%	6
Wyoming	**Wyoming**	**16.85%**	**15.04%**	**18.83%**	
Wyoming	Judicial District 1 (Laramie)	15.97%	12.84%	19.68%	5
Wyoming	Judicial District 2	27.08%	21.88%	33.00%	7
Wyoming	Judicial District 3	14.43%	11.61%	17.79%	4
Wyoming	Judicial District 4	17.30%	13.91%	21.31%	5
Wyoming	Judicial District 5	16.27%	12.92%	20.29%	5
Wyoming	Judicial District 6	14.68%	11.59%	18.41%	4
Wyoming	Judicial District 7 (Natrona)	16.07%	12.87%	19.88%	5
Wyoming	Judicial District 8	17.63%	14.15%	21.75%	5
Wyoming	Judicial District 9	13.84%	10.88%	17.46%	4

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health (NSDUH), 2012 to 2014.

SUMMARY

Background: Alcohol use constitutes a serious public health issue for young people in the United States. Although the national trend in underage drinking is encouraging, this issue remains a concern. **Method:** Combined 2012–2014 National Survey on Drug Use and Health national, regional, state-level, and substate-level estimates of past month binge drinking among people aged 12 to 20 were analyzed. **Results:** Underage binge drinking estimates vary extensively among census regions, within each state, and throughout the nation. Among the substate regions, past month underage binge drinking estimates ranged from 8.37 percent in Shelby County (Tennessee) to 42.39 percent in Ward 2 (District of Columbia). Compared with the estimate from 2010–2012, the estimate of past month underage binge drinking in 2012–2014 was lower in the nation as a whole (15.87 percent in 2010–2012 vs. 14.44 percent in 2012–2014). Eighteen states plus the District of Columbia experienced a statistically significant decrease from 2010–2012 to 2012–2014 in the rate of past month underage binge drinking, while the remaining 32 states experienced no change in past month underage binge drinking. **Conclusion:** Highlighting the percentage of youths engaging in underage binge drinking at state and substate levels can help policymakers inform their assessments of substance abuse needs in their communities.

Keywords: underage binge drinking, National Survey on Drug Use and Health, NSDUH, state, substate

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KEYWORDS

Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, Wyoming, Short Report, Population Data, 2010, 2011, 2012, 2013, 2014, Parents and Caregivers, Prevention Professionals, Underage Drinking, All US States Only

The Substance Abuse and Mental Health Services Administration (SAMHSA) is the agency within the U.S. Department of Health and Human Services that leads public health efforts to advance the behavioral health of the nation. SAMHSA's mission is to reduce the impact of substance abuse and mental illness on America's communities.

The National Survey on Drug Use and Health (NSDUH) is an annual survey sponsored by The Substance Abuse and Mental Health Services Administration (SAMHSA). Findings in this report are annual averages based on combined 2012–2014 NSDUH data from approximately 84,700 respondents aged 12 to 20. The 2010–2012 NSDUH estimates are based on information obtained from approximately 94,200 people aged 12 to 20. The NSDUH collects data by administering questionnaires to a representative sample of the population through face-to-face interviews at their place of residence.

The CBHSQ Report is prepared by The Center for Behavioral Health Statistics and Quality (CBHSQ), SAMHSA, and by RTI International in Research Triangle Park, North Carolina. (RTI International is a trade name of Research Triangle Institute.)

Information on the most recent NSDUH is available in the following publication:

Center for Behavioral Health Statistics and Quality. (2016). *Key substance use and mental health indicators in the United States: Results from the 2015 National Survey on Drug Use and Health* (HHS Publication No. SMA 16-4984, NSDUH Series H-51). Retrieved from http://www.samhsa.gov/data/

Also available online: http://www.samhsa.gov/data/population-data-nsduh.

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